Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte STUART R. BALL

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Appeal No. 1998-0752
Application 08/389,096

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ON BRIEF

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Before KRASS, FLEMING, and GROSS, **Administrative Patent Judges**.

FLEMING, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-4 and 8-12. Claims 1-4 and 8-17 are pending in the application; claims 13-17 have been allowed.

The invention relates to methods for recognition of printed characters, particularly magnetically scanable characters on bank documents. In one embodiment of the

invention, the method includes scanning a document having such characters to generate a waveform having a time varying amplitude (specification, page 15, lines 6-15); sampling the waveform at a predetermined number of positions (page 15, lines 21-28); normalizing the samples by dividing each sample by the computed average magnitude of all samples (page 16, lines 18-23); determining the difference in amplitude between each normalized sample and the previous normalized sample to generate a set of "ratio difference values" (page 17, lines 5-12); and comparing that set of ratio difference values to stored sets of ratio difference values, the closest match being selected as the recognized character (page 17, lines 12-16). In another embodiment of the invention, the method uses the numerical difference between normalized samples to generate a set of identifiers that determine whether the waveform has a rising slope, falling slope, or no change in slope from one sample to the next, the set of identifiers being compared with stored sets of identifiers in order to make a character recognition decision (page 18, lines 11-28).

Independent claims 1 and 9 are reproduced as follows:

1. A method for recognizing one or more characters on a document and the like comprising the steps of:

scanning said document with a device which is operable to generate a signal having a time varying amplitude represented by a waveform which is peculiar to the shape of a character being scanned;

determining the amplitude of said waveform at a predetermined number of positions on a time scale of said waveform, representing one dimension of said character, to provide a set of sample values of the amplitude of said waveform;

calculating the amplitude ratio value of a predetermined number of samples of a set by dividing each sample magnitude by the average magnitude of the predetermined number of samples of the set;

determining the difference between selected ones of said sample amplitude ratio values with respect to an adjacent sample amplitude ratio value to generate a set of ratio difference values; and

comparing said set of ratio difference values to predetermined sets of ratio difference values, each of said predetermined sets of ratio difference values representing the identity of a character, to recognize the character being scanned.

9. A method for recognizing one or more characters on a document and the like comprising the steps of:

scanning said document with a device which is operable to generate a signal having a time varying amplitude waveform which is peculiar to the shape of a character being scanned;

determining the amplitude of said waveform at a predetermined number of positions on a time scale of said

waveform, representing one dimension of said character, to provide a set of sample values of the amplitude of said waveform;

calculating the amplitude ratio value of each sample of a set by dividing each sample magnitude by the average sample magnitude of the set;

determining the numerical difference between selected ones of said sample amplitude ratio values with respect to an adjacent sample amplitude ratio value to generate a set of identifiers which determine whether said waveform has a rising slope, a falling slope, or no change in slope between respective ones of said selected ones of said sample amplitude ratio values; and

comparing said set of identifiers with plural predetermined sets of identifiers, each representing the identity of a character, to recognize the character being scanned.

The Examiner relies on the following references:

Toyama	4,399,553	Aug. 16, 1983
Kao	4,245,211	Jan. 13, 1981
Roberts	4,032,887	Jun. 28, 1977

Appellant's admitted Prior Art ("AAPA")

Claims 1, 2, and 8-10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Toyama in view of Kao and AAPA.

Claims 3, 4, 11, and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Toyama in view of Kao, AAPA, and Roberts.

Rather than repeat the arguments of Appellant or the Examiner, we make reference to the brief and the answer for the details thereof.

OPINION

After a careful review of the evidence before us, we agree with the Examiner that claims 9, 11, and 12 are properly rejected under 35 U.S.C. § 103. Thus, we will sustain the rejection of these claims; but we will reverse the rejection of the remaining claims on appeal for the reasons set forth ***infra***.

It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the reasonable teachings or suggestions found in the prior art, or by a reasonable inference to the artisan contained in such teachings or suggestions. ***In re Sernaker***, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). In addition, the Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." ***In***

re Fritch, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), ***citing In re Gordon***, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

"Additionally, when determining obviousness, the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." ***Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.***, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), ***cert. denied***, 117 S. Ct. 80 (1996), ***citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.***, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), ***cert. denied***, 469 U.S. 851 (1984). In addition, the Federal Circuit reasons in **Para-Ordnance Mfg.**, 73 F.3d at 1087-88, 37 USPQ2d at 1239-40, that for the determination of obviousness, the court must answer whether one of ordinary skill in the art who sets out to solve the problem, and who had before him in his workshop the prior art, would have been reasonably expected to use the solution that is claimed by the Appellant.

On page 12 of the Brief, Appellant argues that the combination of Toyama, Kao, and AAPA fails to teach the invention of claim 9 because the combination allegedly lacks a

teaching of determining the numerical difference between selected ones of the sample amplitude ratio values with respect to an adjacent sample amplitude ratio value to generate a set of identifiers which determine whether the waveform has a rising slope, a falling slope or no change in slope and then comparing the set of identifiers with plural predetermined sets of identifiers, each representing the identity of a character.

With respect to claim 9, we find that Toyama teaches a method for recognizing (magnetic ink) characters on a document, comprising scanning the document with a device operable to generate a signal with an amplitude waveform peculiar to the shape of the character being scanned (column 3, lines 3-29); determining the amplitude of the waveform at a predetermined number of positions (column 3, lines 50-60; sample and hold circuit 17); determining the numerical difference between adjacent samples to generate a set of identifiers that indicate rising slope, falling slope, or no slope change (column 4, lines 25-56; comparators 20, 21, flip-flops 22, 23); and comparing the set of identifiers with

plural predetermined sets of identifiers in order to recognize the character being scanned (column 4, line 57 to column 5, line 19). Toyama lacks a teaching of normalizing the sampled amplitudes, *i.e.*, "calculating the amplitude ratio value of each sample of a set by dividing each sample magnitude by the average sample magnitude of the set."

Kao suggests, in the context of reading magnetic ink characters, normalizing sampled amplitudes by dividing each sample value by the largest sample found (column 5, line 55 to column 6, line 15). Appellant admits at page 3, lines 9-22 of the specification that "recently, methods have been developed" whereby "[t]he series of digital words, representing the full character width, are summed to create an average and each individual word is divided by the average to generate a new digital word that represents the ratio of the individual digital words to the average."

We find that those skilled in the art having the teachings of Toyama, Kao, and AAPA before them would have normalized the sample amplitudes by dividing each amplitude by the average of all samples, because Kao suggests that

normalization "makes all characters the same size" (column 5, lines 58-59). Kao recognizes that "waveform amplitude is a function of the ink signal strength" (column 3, lines 56-57). Appellant admits at page 2 of the specification that many problems may cause character reading devices to produce signal defects. The person having ordinary skill in the art would have recognized that Kao's suggestion to make all characters the same "size" (i.e., amplitude) would solve the problem of different documents producing signals of different amplitudes.

Therefore, we find that it would have been obvious to one skilled in the art in view of the teachings of Toyama, Kao, and AAPA to calculate the amplitude ratio value of each sample of a set by dividing each sample magnitude by the average magnitude, then generate a set of identifiers, then compare each set of identifiers with predetermined sets of identifiers to recognize a character being scanned, as recited in claim 9.

On pages 12 and 13 of the Brief, Appellant urges that claims 11 and 12 are patentable for the reasons set forth in support of the patentability of claims 3 and 4, respectively. Appellant does not discuss the limitations of claim 9, from

which claims 11 and 12 depend, that are not present in claim 1, from which claims 3 and 4 depend. Specifically, as noted ***supra***, we find that claim 9's limitation of "generating a set of identifiers" which signify rising slope, falling slope, or no slope is taught by Toyama. Because that limitation is not present in claim 1, we are not persuaded that claims 11 and 12 should be patentable for the same reasons that claims 3 and 4, respectively, are patentable.

With respect to claims 11 and 12, we find that Kao teaches character recognition "by finding a correlation between the normalized waveshape and one of the defined character waveform patterns stored in ROM" (column 6, lines 16-19). Kao thus teaches comparing amplitude ratios (i.e., normalized amplitudes) of the samples of each set with predetermined sets of amplitude ratios, in order to identify which character has been read. We further find that Roberts teaches applying plural pattern recognition techniques to a set of input data, and selecting an output from among the recognition methods (see column 2, lines 1-12, and Figure 3).

We find that those skilled in the art, having the

teachings of Toyama, Kao, AAPA and Roberts before them, would have included the ability to recognize a character by comparing a set of normalized amplitudes with predetermined sets of normalized amplitudes, and selecting the set with the highest correlation as the identified character, as taught by Kao, because Kao suggests that normalized MICR waveform amplitude samples may be effectively compared with stored amplitude samples to recognize printed characters. We further find that those skilled in the art would have modified the combination of claim 9 ***supra*** to perform simultaneously (at least) two methods of character recognition, and arbitrate between the results, because Roberts suggests that the use of plural recognition systems reduces the number of recognition errors produced, and makes the system more robust and able to respond to a variety of inputs (see column 1, lines 65-68). Therefore, we find that it would have been obvious to modify the combination of Toyama, Kao, and AAPA, expressed ***supra*** with respect to claim 9, to provide plural recognition methods, including comparing a set of normalized amplitudes with predetermined sets, as recited in claim 11, and choosing

between the results of those recognition methods, as recited in claim 12.

On pages 8 and 9 of the Brief, Appellant argues that the combination of Toyama, Kao, and AAPA fails to suggest the invention recited in claim 1, because none of the references disclose or suggest the step of determining the differences between adjacent (normalized) samples to generate a set of ratio

difference values, and them comparing such a set with predetermined sets of ratio difference values to recognize a character being scanned.

Upon a careful review of Toyama, Kao, and AAPA, we fail to find that any reference or combination of references teaches determining the difference between selected sample amplitude ratio values and adjacent sample amplitude ratio values to generate a set of ratio difference values, followed by comparing that set of ratio difference values with stored ratio difference value sets to determine a recognized

character, as is recited in claim 1. The system of comparators and flip-flops used in Toyama serves to produce a pair of (binary) identifiers that signal whether the slope of the amplitude curve is rising, falling, or steady. Toyama, however, does not contemplate generating a set of (numerical) ratio difference values, as illustrated in Appellant's Figure 3C, to be compared with predetermined sets of ratio difference values. Kao teaches a MICR waveform analyzer. As noted ***supra***, however, Kao teaches comparison of normalized amplitudes to store sets of normalized amplitudes. Kao does not compute numerical differences between adjacent samples.

Thus, we fail to find that the combination proposed by the Examiner would have resulted in the claimed invention.

Claims 2-4 depend from claim 1; therefore, the rejection of claims 2-4 is reversed for the same reasons expressed **supra** with regard to claim 1. Independent claim 8 contains limitations parallel to those contained in claim 1, *i.e.*,

determining the numerical differences between adjacent sample amplitude ratio values, and comparing the set of ratio difference values to previously stored sets to determine the "event" recognized. Therefore, we find that the prior art relied upon by the Examiner fails to teach the limitations of claim 8, for the same reasons specified with respect to claim 1. Thus, we will not sustain the rejection of claims 1-4 and 8 under 35 U.S.C. § 103.

On page 12 of the Brief, Appellant argues that claim 10 is patentable because the step of setting threshold values of differences between adjacent sample amplitude ratio values, in order to identify whether the slope is rising, falling, or unchanged, is not taught by the combination of Toyama, Kao, and AAPA advanced by the Examiner.

Upon a careful review of the references applied by the Examiner, we fail to find that any one of Toyama, Kao, or AAPA teach the setting of threshold values of the difference between normalized sample amplitudes which define whether their slope is rising, falling, or unchanging. Toyama merely teaches a two comparator system, in which one comparator

output goes high to indicate a rising slope, the other comparator output goes high to indicate a falling slope; should both outputs be low, the result is interpreted as no change (Figures 4 and 6). Toyama does not teach the ability to set a numerical difference between adjacent normalized samples that will be defined as the threshold between rising slope and no slope, or between no slope and falling slope. Thus, we will not sustain the rejection of claim 10 under 35 U.S.C. § 103.

In view of the foregoing, the decision of the Examiner rejecting claims 9, 11, and 12 under 35 U.S.C. § 103 is affirmed; the decision of the Examiner rejecting claims 1-4, 8, and 10 under U.S.C. § 103, however, is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

ERROL A. KRASS Administrative Patent Judge	)	
MICHAEL R. FLEMING Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
ANITA PELLMAN GROSS Administrative Patent Judge	)	

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